APPENDIX I

FORMULA FOR THE INVERTED WEIR ACCORDING TO THE COMPUTATION OF PROF. J.-C. YESMANN («

A CURRENT of hot gas of indefinite width is moving downward at a very low velocity *v* (Fig. 25). After it has reached the level of a horizontal sill *DD* having a length *B* (this dimension being taken at right angles to the section shown) which is fixed, the current commences to flow in a stream of a certain depth below the sill, which confines it upon its upper surface. The dimensions and arrangement of the orifice through which the gas flows are assumed to permit it to flow freely without any increase in pressure. The flow of the gas under these conditions is analogous to the flow of a stream of water over the crest of a weir or dam.

As the gas reaches the level of the sill it changes its direction of flow; the very slight vertical velocity becomes horizontal and is increased by reason of differences in pressure and level. The layer of gas, as it commences to flow horizontally, will be very thin. If the width of the inverted weir or sill from *D* to *D* is sufficient, as the flow is established, it will in time traverse some given section as a current composed of a number of parallel stream lines.

Take two cross-sections of the flowing stream, *ab,* where the gas has not yet acquired the horizontal velocity component, and *cd,* where it may be considered that the motion takes place in parallel streams with a velocity *V.* The current at this point being established, the small vertical velocity *v,* which is very slight as compared with the horizontal velocity *V,* may be neglected. It may therefore be concluded that the horizontal flow is effected by reason of a difference in head or level, this last being composed of the sum of the piezo and isometric heads.

(1) Extract from an article appearing in 1910 in the *Annales de VInstitut Poly technique de Petrograd.*